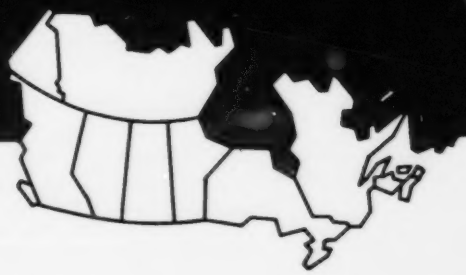

Effect of forestry practices on the environment

Loss of forests from fire, insects, disease and pollutants

Uncertainty of wood supply

Inadequate knowledge of intensive forest management practices

Forest land alienation

Inadequate forest legislation and policy

89-03275/

## NEWFOUNDLAND FORESTRY CENTRE

The Newfoundland Forestry Centre (NeFC) is an establishment of the Canadian Forestry Service. The Centre conducts most of the forestry research in the Newfoundland Region and is one of six similar regional establishments in Canada.

The objective of NeFC is to provide the scientific, technological and economic information and services required for the improvement, protection, and efficient utilization of the forest resources of the province of Newfoundland and Labrador. Its work is directed towards satisfying the requirements of the Provincial Government, the forest industry, federal agencies having forestry related programs and other clients of the Canadian Forestry Service; many of its studies are undertaken jointly with client agencies. The Centre attempts to bring the results of research to potential users by publishing information reports, articles in scientific journals, and by demonstrations of research results. It seeks to keep the public informed of its work by means of special displays, seminars, and related activities.

The NeFC program has three principal components - Forest Resources and Environmental Research, Forest Protection Research, and Forestry Development.

# STRATEGIC FOREST SECTOR ISSUES IN NEWFOUNDLAND AND POTENTIAL CFS PROGRAM INITIATIVES

by G.R. Milne

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**ABSTRACT**

A Delphi survey and follow up workshop were used to develop a list of forest sector priorities and potential Forestry Canada program initiatives for Newfoundland and Labrador. The information was required for strategic planning, primarily in research. Thirty-eight individuals representing a cross-section of opinion were surveyed. Thirteen forest sector issues and 76 potential program initiatives were identified. The six top ranking issues and associated program initiatives were discussed at the workshop. The most critical issues relate to the effect of forestry practices upon the environment, forest protection and long term wood supply.

**RÉSUMÉ**

On a eu recours à un questionnaire individuel et à un atelier complémentaire pour dresser une liste des priorités du secteur forestier et des projets possibles du programme du Service canadien des forêts pour Terre-Neuve et le Labrador. Ces renseignements étaient nécessaires pour la planification stratégique, surtout dans le domaine de la recherche. Le questionnaire a été rempli par 38 personnes représentant des opinions différentes. On a relevé 13 questions se rapportant au secteur forestier et 76 projets possibles pour le programme. Les six questions en tête de liste et les projets reliés à ces dernières ont été discutés à l'atelier. Les questions les plus importantes ont trait à l'effet des méthodes forestières sur l'environnement, à la protection des forêts et à l'approvisionnement en bois à long terme.

## EXECUTIVE SUMMARY

The Newfoundland Forestry Centre (NeFC) is presently developing a strategic plan to assist in setting long-term program objectives. As part of this planning process, information was required on strategic forest sector issues and potential NeFC program initiatives over a five to ten year time horizon. To ensure that the full scope of information was collected, a decision was made by senior management of NeFC to solicit input from a number of individuals representing a cross-section of opinion.

The necessary information was gathered using a Delphi survey of two sequential questionnaires followed with a highly structured workshop. Thirty-eight individuals were surveyed. Twenty-three of these individuals attended the workshop. For both the survey and workshop, an attempt was made to maintain a balance between individuals with a strong forest products orientation (industry, Provincial Forestry, etc.) and people with non-fibre orientation (academia, government wildlife and environment departments, etc.).

Thirteen strategic forest sector issues were identified and ranked in order of priority. The six top ranking issues were discussed and repriorized at the workshop. A preliminary consensus between the survey and workshop ranking of these six issues indicated that three issues are most critical:

1. The effect of forestry practices on the environment,

2. The loss of forests from fire, insects, and disease, and

3. The uncertain situation of wood supply versus demand.

One point of agreement was that little difference exists in the relative ranking between these three issues. Each issue should be viewed as being of equal importance. Also, the latter two issues are strongly related. The remaining three issues from the top six are listed in order of priority:

4. Forest land alienation due to poor comprehensive land-use planning and a reliance on single-use rather than multiple-use management,

5. Inadequate understanding of intensive forest management practices, for example site preparation, planting, seeding, prescribed burning, etc., and

6. Need to improve and further develop forest legislation and policy relating to a number of issues such as land tenure, private woodlots, control over domestic cutting and government funding in forestry.

For issues 1, 2, 3, and 5, NeFC can play a major role through programs of research, forestry development and technology transfer. With issues 4 and 6, NeFC can play a supportive role to the provincial government through the provision of advice and expertise when requested. For all 13 issues, 76 potential program initiatives for NeFC were suggested and priorized in the survey. The program initiatives for the six top ranking issues were further elaborated and reranked.

Limited financial and human resources at NeFC reflect the broader situation of restraint in the federal government. Major program expansion at NeFC is therefore unlikely without tapping external sources of funding such as the federal-provincial Forest Resource Development Agreement. While major shifts in program direction would be counterproductive, more gradual shifts are possible as staff vacancies from retirement, transfer or resignation are filled. Within NeFC at present, improvements in productivity through training and new technology can occur; however, any gains may only offset the effect of inflation on limited budgets.

Many of the suggested program initiatives for the 13 issues are presently being addressed to some degree by the CFS and other forestry agencies in Newfoundland. For the purposes of strategic planning, NeFC managers will need to assess the scope of current CFS program direction in comparison with the key issues and initiatives identified in this report.

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## 1.0 INTRODUCTION

Following an internal review of planning and program management at the Newfoundland Forestry Centre (NeFC) in 1987, senior management determined that improvements to the planning process were required. The internal review indicated that the Centre lacked a clear sense of long-term direction. Questions raised by both staff and managers included: "where is NeFC going in the next 5 to 10 years; what is our mandate in Newfoundland; what are the key forest sector issues in this region and how will these change over time; and what kind of activities should NeFC undertake in research, development, technology transfer, and information services to address the major issues?" These types of questions and the absence of readily available answers, clearly signaled that a strategic plan was necessary as the foundation for improved planning at NeFC. A strategic plan tailored to regional problems and opportunities, and the strategic planning process itself were seen as the mechanisms to improve program focus and direction at NeFC. Consequently, an objective was established to develop a strategic plan at the Centre during 1988.

Strategic planning demands a broad perspective and long-term vision to effectively articulate both direction and purpose in an organization. For NeFC's strategic plan, information was required on current forest sector issues in the province as well as issues emerging over the next 5 to 10 years. While this information would help in determining program direction at NeFC, a list of possible issue-oriented research and development initiatives would provide guidance in setting program content.

Given the dynamic characteristics of the forest resource, the complexity of the forest ecosystem, and the multiple demands placed on forests by man, a comprehensive information base on forestry issues and possible CFS initiatives was necessary, particularly in the area of forest research. Senior management realized that NeFC did not have the full range of expertise on staff to properly address these information needs. Also, by developing this information in total isolation, NeFC could establish inappropriate programs to meet emerging problems in the forest sector. Therefore, a decision was made to solicit input on forestry issues and potential CFS research initiatives from a wide cross-section of individuals outside NeFC.

## 2.0 THE CFS ROLE IN RESEARCH

### 2.1 The National Role

The CFS is the lead federal agency for conducting forestry research in Canada. From the recent CFS Strategic Plan for Research (Anon., 1987), the key research priorities, in no particular order, are:

i) **Forest Economics** - economically available wood supplies; forest crop replacement costs; Forest Economics and Policy Analysis Project.

ii) **Major Forest Pests** - population dynamics and impacts; integrated pest management; biotechnological tools; pests of plantations and intensively managed forests.

iii) **Forest Insect and Disease Survey** - survey activities; integration of survey data with forestry statistics; sharing of survey responsibilities with provinces.

iv) **Forest Fire Management** - fire danger rating system; fire occurrence and behavior models; transfer of fire management technology.

v) **Acid Rain and Other Pollutants** - early symptoms; deposition and fate of pollutants; ecosystem impacts; hardwood declines.

vi) **Vegetation Management** - weed control for the new forest.

vii) **Tree Improvement and Genetics** - genetic and biotechnological techniques for second generation renewal; shift of semi-operational programs to provinces and industry.

viii) **Ecological Basis of Forest Management** - environmental effects of forestry practices; silvicultural systems responsive to ecological and site factors.

ix) **Forest Productivity and Production Systems** - growth and yield research and forestry statistics, especially for intensive management; integrated forest management systems.

x) **Harvesting and Utilization** - support for FERIC and FORINTEK in silvicultural mechanization, harvesting and wood products.

xi) **Special Strategic Concern** - biotechnology; climate change; woodlot management; and urban forestry.

These priorities are designed to address the mission of CFS research which is to enhance economic, social and environmental benefits derived from forests and forest-based industries in Canada through a well-focused program of research, and scientific and technical services.

The overall CFS research strategy is to continue to strengthen its core role of mission-oriented applied research and technology transfer at the regional, national and international levels. At the regional level, forestry centres will maintain strong R & D programs that address regional concerns as well as the regional components of national concerns and responsibilities. Measures to reinforce and to improve linkages between advisory committees, to continue bilateral research agreements, and to refine internal processes for allocating research responsibilities and budgets will constitute important elements of strategy. At the national level, institutes will continue to focus on research of a more fundamental or methodological nature that is national or inter-regional in scope. Internationally, the CFS will continue to be the major voice for forestry research in Canada and an active participant in international forestry agencies.

## 2.2 The Regional Role

The CFS is a national department with national priorities, however, the organization's structure is regional in orientation. Given Canada's vast size and differing regional characteristics, the national mission must be broad in scope. A more focused regional mission of the NeFC is:

The NeFC of the CFS is the lead federal agency in Newfoundland and Labrador responsible for:

- conducting forestry research to produce scientific and technical knowledge,
- managing forestry development agreements and other related programs,
- disseminating scientific and technical information, and
- providing forest policy advisory services,

to enhance the economic, environmental and social benefits from the forest resources in the region. The principal clients are the provincial, federal and private forestry related agencies, the scientific community, educational institutions and the general public. The programs of NeFC are designed to have a significant impact on the forest sector, primarily in the region, and contribute to national and international knowledge in forestry.

The NeFC mission statement reflects the general mandate of the CFS to conduct forestry research, and negotiate and fund forestry development agreements in association with provincial government objectives and policies. This mandate clearly recognizes the constitutional authority of the provincial government over forest resource ownership, management and administration.

Any priorities of the NeFC must address regional concerns, yet concurrently mesh with the broader national CFS mission and priorities in research.

## 3.0 METHODS

### 3.1 Options For Collecting Information

Two main approaches exist for collecting judgmental information on a specific topic from a diverse group of individuals. The first approach is the Delphi Technique which uses sequential questionnaires to collect and pool individual judgments into a consensus view. An advantage of this method is that participants remain anonymous in providing their input, free from peer or group pressure. Also, the influence of dominating individuals in group discussions is eliminated (Jegr and Thompson, 1975). Usually, three questionnaires are required, but the number and design can be modified depending on the nature of the problem being examined and available resources (Phillips et al.,1986).

The second approach involves a meeting of individuals and is known variously as a brainstorming session, Group Constructs Technique, or the Nominal Group Technique. This approach uses a structured meeting to form a consensus of opinion.

### 3.2 The NeFC Approach

NeFC used a combination of both approaches. First, a Delphi survey of two questionnaires gathered individual judgments about long-term forest sector issues and potential CFS initiatives to address the issues. The survey also solicited opinion on the ranking of issues and initiatives. Second, a structured workshop was held following the survey to provide closure of the

Delphi survey by developing group rankings of the key issues and initiatives, comparing individual rankings from the survey with the group rankings, and forming a consensus between both approaches.

3.3 Selection Of Participants

The senior management of NeFC nominated 38 individuals (Appendix 1) to participate in the survey and follow-up workshop. The individuals represented a cross-section of opinion on Newfoundland's forestry sector. While the individual's position was a factor in the nomination process, selection criteria also included a knowledge of forestry (both fibre and non-fibre aspects) and an interest in research and development.

3.4 Objectives Of The First Questionnaire

In late March 1988, all participants were contacted by telephone or mail to inform them of the survey and its objectives, and to ask for their cooperation. On April 5, the first questionnaire (Appendix 2) was sent to the 38 participants along with a covering letter explaining the survey procedure and rationale. The principal objective of the first questionnaire was to collect individual judgments on key provincial forest sector issues and potential CFS program initiatives to address the issues. A second objective was to gain a consensus on criteria for ranking forestry issues in the second questionnaire.

The first questionnaire was divided into three parts. Part 1 asked respondents to describe their professional role, for example forester, administrator, researcher etc., and specify their employer. Part 2 first asked respondents to list key forest sector issues in Newfoundland. The issues could presently exist or might develop in 5 to 10 years. Second, respondents were asked to specify whether or not the CFS should address each issue. To assist in this task, information was provided on the mandate and mission of NeFC. Third, for those issues which the CFS might address, respondents were asked to provide suggested thrusts in programming for research, development, technology transfer etc. The last part of the questionnaire asked respondents to rate the appropriateness of three criteria for ranking a list of forest sector issues in the second questionnaire. The three criteria were potential economic, social and environmental impact. Space was also provided for respondents to include additional criteria. All criteria were rated by respondents using a 5-point scale with 1 being lowest and 5 being highest.

3.5 Objectives of the Second Questionnaire

The second questionnaire (Appendix 3) was formulated from the aggregate responses on the first questionnaire and was mailed to the 38 participants on May 13. The objectives were to collect individual ratings from a list of key forest sector issues and, for each issue, a list of suggested CFS program initiatives.

The questionnaire consisted of two parts. Part 1 asked respondents to rate a list of 13 forest sector issues using the criteria of potential environmental and social impacts. These criteria were chosen by respondents in the first questionnaire. For each issue, a score was assigned to both criteria on a 5-point scale. Part 2 of the questionnaire presented respondents with the list of CFS program initiatives associated with each issue. Respondents were asked

to rate these initiatives using the criteria of urgency and importance. These criteria were used in a similar study in western Canada (Phillips et al. 1986), and provided a convenient method for rating the various initiatives. Scores were assigned to both criteria for every initiative on a scale from 1 to 5.

3.6 Objectives of the Follow-up Workshop

Planning for the workshop began in May. On June 1, all participants were sent a formal invitation to the workshop. The workshop was held in Gander, Newfoundland on June 21 and 22. Gander was selected because of its central location and good accessibility by air and road. The workshop objectives were to provide closure to the study by presenting the aggregate survey results of individual ratings of issues and initiatives, deriving group ratings of issues and initiatives, and comparing both approaches. An overall objective was to develop a preliminary consensus among participants on forest sector issues and CFS initiatives. To assist in achieving these objectives, a professional facilitator was hired from the Faculty of Business Administration, Memorial University.

The workshop agenda (Appendix 4) consisted of several well-defined steps:

Step 1

First, the rationale, objectives and format of the workshop were explained to all participants. Second, an outline of the questionnaire survey was given.

Step 2

Participants broke off into sub-groups of five persons to discuss and rank the six issues which had ranked highest in the questionnaire survey. The issues were presented unranked, in the order they appeared on the questionnaire. The objective of this exercise was to derive group rankings of the top six issues as a comparison to the ranking by individuals in the survey. The decision to examine six issues in detail as opposed to four, five, eight or all 13, was based on limitations of time and the need to develop programs at NeFC which focus on the most critical issues. Examining only six issues in detail reinforced the idea of setting priorities. A contributing factor was the constraint of group dynamics with five people being the minimum for effective discussions. Given that only five sub-groups could be established at the workshop, the number of issues and corresponding program initiatives which could be examined in detail had to be limited. The sub-groups presented their ranking of the six key issues and a summary chart was prepared which contrasted the group ranking with the survey ranking. The two sets of results were elaborated upon and compared in a plenary session.

Step 3

The five sub-groups were each assigned one issue (one group had two issues) out of the six key issues. The sub-groups were charged with the task of discussing the potential CFS initiatives for the assigned issue. These discussions were from an ideal perspective, that is, no resource constraints at NeFC. The sub-groups presented their findings in a plenary session with open discussion, comments and criticism.

Step 4

A presentation was given to all participants on the resource constraints at NeFC, both currently and the expected trend in the next several years. This presentation was designed to impart a message that with limited resources, choices had to be made at NeFC regarding program direction and content.

Step 5

Participants returned to their sub-groups to rank the potential CFS initiatives for the assigned issue. This ranking was done with an awareness of financial and person-year constraints at NeFC. The sub-groups presented their results in a plenary session. At this time, the survey ranking of the initiatives was distributed for comparison.

Step 6

A summary of the workshop was presented by the facilitator, this author and the Regional Director General of NeFC. Also, the facilitator distributed an evaluation form for participants to provide feedback on the workshop.

## 4.0 RESULTS

### 4.1 Results of the First Questionnaire

Thirty-five out of 38 questionnaires were returned for a 92% response rate. The high response rate clearly indicated a strong level of interest in the survey by those individuals participating. The majority of respondents were federal employees (54%), two-thirds of which are employed by NeFC as either managers or research scientists. The next largest category was provincial employees (26%), primarily from the Department of Forestry. Forty percent of respondents defined their role as an Administrator/Manager. The other large groupings were Researcher (23%) and Senior Forest Manager (14%) (Appendix 5).

The first phase of the analysis was to summarize the diverse and often overlapping responses on forest sector issues. The nearly 200 issues initially identified were gradually grouped into 13 separate issues (see Questionnaire 2, Appendix 3). The approach of grouping the responses into common headings was selected for two reasons. First, the sheer number of issues would have generated an extremely long second questionnaire. Second, the overlap between most of the responses lent itself to grouping. While some interpretive bias might have occurred, nearly all the responses on issues could be slotted into one of the 13 key issues. These 13 issues therefore captured the bulk of information from all respondents.

The second phase of the analysis was to allocate the numerous suggestions for CFS program initiatives among the 13 forestry issues (see Questionnaire 2, Appendix 3). Potential initiatives were first grouped into similar categories. For example, timber supply modelling, forecasting wood demand, predicting wood requirements, estimating future wood supply, etc., all relate to a similar theme, in this case timber supply/demand modelling. Concurrently, a count was maintained of the respondents' indication as to whether or not an initiative

should be undertaken by the CFS. An initiative was included if the majority of respondents indicated that the CFS should conduct work relating to the initiative. A subjective aspect arose in determining which of the 13 issues the particular initiative addressed. In the previous example, the initiative of timber supply/demand modelling clearly addresses the issue of future wood shortages. In most cases, the linkage between initiatives and issues was very strong.

The third phase of the analysis was to select the criteria for ranking the forestry issues from the aggregate scores of all individual responses. Out of five points, the mean scores of the three criteria were: potential environmental impact, 4.25; potential economic impact, 4.17; potential social impact, 3.71. Using a standard difference of means test at the 95% confidence level, the third criterion, potential social impact, was discarded. Four additional criteria were suggested by respondents relating to public awareness, however, mean scores in the order of 3.00 to 3.33 ruled out their inclusion. More detailed statistical information on the selection of criteria are presented in Appendix 5.

## 4.2 Results of the Second Questionnaire

### 4.2.1 The Response Rate

Twenty-seven out of 38 questionnaires were returned for a 71% response rate. The decline in response rate from the first questionnaire is not unusual in surveys involving a series of questionnaires, especially where the complexity increases in succeeding rounds. In many mail surveys, a response rate of 20% is satisfactory. Thus, the 71% response rate for the second questionnaire was still very favourable.

### 4.2.2 Ranking of the Forestry Issues

Initially, the forest sector issues were ranked using the aggregate scores from all respondents. The issues were ranked in three ways: by the criterion of potential economic impact, by the criterion of potential environmental impact, and by an average of both criteria (Appendix 7). In addition, Appendix 7 provides the standard deviation from the mean score for each criterion. The standard deviation is an indication of general consensus on the mean score by all respondents. The lower the standard deviation, the higher the consensus or level of agreement.

The combined ranking results (Table 1) assumed each of the separate criteria were weighted equally. This assumption reflects the similarity of individual ratings of these criteria (4.25 for environmental impacts and 4.17 for economic impacts) from the first questionnaire. The difference between these mean scores is only 1.9%. Statistically, the two means are not significantly different at the 95% confidence level.

An examination of the ranked issues indicates some interesting features. First, based on the overall ranking, issue 1, (The effect of forestry practices on the environment), scored highest. This ranking differs from the conventional wisdom among the forestry community in Newfoundland that wood supply is the most critical issue. However, issues relating to wood supply ( issues 3, 8, and 2) were still viewed as important. One point to consider is that respondents may

Table 1. Final survey ranking of forest sector issues by combined mean scores for potential economic and environmental impact.

| Issue Number | Ranking | Issues | Combined Mean Score |
|---|---|---|---|
| (1) | 1 | The effect of forestry practices (harvesting, processing, management) on the environment. | 4.08 |
| (3) | 2 | Loss of forests from fire, insects and disease. | 3.73 |
| (8) | 3 | Forest land alienation due to poor comprehensive land-use planning and a reliance on single-use rather than multiple-use management. | 3.66 |
| (2) | 4 | Uncertain situation of future wood supply versus demand, including pulpwood, sawlogs and fuelwood. | 3.65 |
| (4) | 5 | Inadequate understanding of intensive forest management practices, for example, site preparation, planting, seeding, thinning, prescribed burning, etc. | 3.32 |
| (10) | 6 | Need to improve and further develop forest legislation and policy relating to a number of issues such as land tenure, private woodlots, control over domestic cutting, and government funding in forestry. | 3.26 |
| (12) | 7 | Inadequate adoption of new technology in forestry harvesting and processing in Newfoundland. | 3.13 |
| (7) | 8 | Effect of climate and acid rain on our forest. | 3.11 |
| (9) | 9 | Inadequate species diversity in our commercial forests and insufficient use of genetically improved stock. | 3.06 |
| (6) | 10 | Inadequate information on our forest land base and forest resource inventory. | 2.89 |
| (11) | 11 | Poor diversity in forest products and markets in Newfoundland. | 2.87 |
| (13) | 12 | Inadequate communication and education within the forestry sector, and between the forestry sector and the general public. | 2.87 |
| (5) | 13 | Lack of development of the Labrador forest. | 2.80 |

have expressed individual opinions on forestry issues, free from peer or group pressure, which differ from those of their organization or profession.

The ranking of issues by each criteria exhibits marked differences. Based on the criterion of potential economic impact, issue 2, (The uncertain situation of future wood supply, etc.), ranked the highest. Also, issues 2 and 3, which relate to wood supply, ranked ahead of issue 4, (The effect of forestry practices on the environment). Based on the criterion of potential environmental impact, issue 4 ranked first. The second ranked issue was 8, (Forest land alienation, etc.). This particular issue also ranked high using the economic impact criterion. The third ranking issue based on potential environmental impact was number 7, (The effect of climate and acid rain on our forest). In comparison, this issue ranked 13th using the criterion of potential economic impact.

The differences in ranking of the issues between the two criteria likely reflected the variation in background among the respondents. As an example, foresters employed in industry or the Provincial Department of Forestry may feel strongly that the economic aspects of the forest are paramount. Conversely, individuals employed in other fields such as research or education, may view the environmental aspects of the forest as a greater concern. The difference in ranking may also have indicated an inability of some respondents to fully recognize the linkages between the environmental and economic aspects of certain forestry issues. These suppositions are confirmed to some degree by statistical analysis. The measure of correlation between the rankings by each criteria can be determined by the Spearman Rank-Order Correlation Coefficient, or Rho. The value of Rho will lie between -1.00 and +1.00 with either value indicating a perfect correlation. For the two rankings of the 13 forestry issues, the value of Rho is 0.21, thus indicating a low degree of correlation between the ordering by each criteria (Appendix 8).

### 4.2.3 Ranking of the Potential NeFC Initiatives

The procedure for ranking the potential CFS initiatives was the same as for the issues. The main difference however, was that the alternative criteria of urgency and importance were used. The list of ordered CFS initiatives for each issue is presented in Appendix 9 and includes a ranking by each criterion as well as an overall ranking. Seventy-six possible program initiatives were compiled from information in the first questionnaire. The mean scores assigned to the criteria of urgency and importance appear to show little difference. The Spearman Rank-Order Correlation Coefficients for the initiatives under each issue confirm this trend (Appendix 10). The lowest value of Rho is 0.80; as well, the initiatives under four issues have perfect positive correlations. In other words, the two criteria of urgency and importance were interpreted to have similar meanings by questionnaire respondents.

## 4.3 Results of the Workshop

### 4.3.1 Participation

Twenty-eight individuals attended the follow-up workshop in Gander. This number included 23 survey participants, two individuals attending on behalf of survey participants, one additional person from the Provincial Department of Forestry,

the workshop facilitator and this author. A list of workshop participants and their affiliation is presented in Appendix 11. Twenty-five individuals actually participated in the sub-group discussions. The Director General of the NeFC and this author acted as recorders. The group of 25 participants was composed of 11 individuals from NeFC and 14 from other agencies. Approximately one-half of the 25 participants were professional foresters; the remainder covered a range of backgrounds.

4.3.2 Ranking of Issues

While the survey results were clear in the ordering of issues, the group ranking produced three ties for the issue of third priority (Table 2). A comparison of the ranking of issues between the workshop (groups) and survey (individuals) indicates some differences in order, but also many common features. Three of the issues, 3, 8, and 10, had common rankings. The remaining issues had differences in ranking, ranging from a factor of two (issues 1 and 4) to a factor of three (issue 2). Overall, issue 10 must rank at the bottom. Issue 3 must rank fairly high and issue 8 somewhat lower. Assessing the relative order of issues 1, 2 and 4 is more difficult. Issues 1 and 2 must rate high in priority because each received one top ranking. Issue 4 warrants a lower ranking.

To achieve a consensus between the two ratings, a mean score was calculated between the group and survey rankings (Table 3). Three issues emerge as the most important: the effect of forestry practices on the environment; the loss of forests from fire, insects and disease; and the uncertain situation of future wood supply. The latter two issues are strongly related. The concern over future wood supply stems largely from insect damage, both currently and during the past two decades. Determining a final ranking among these three issues is difficult and probably not desirable in order to avoid being overly concerned with scores and numbers. The top three issues should simply be recognized as the key forest sector concerns in Newfoundland.

The remaining three issues are easier to order in terms of drawing a consensus between the survey and group ratings. During the workshop, the linkages between the three lower ranked issues and the top three issues were discussed. For example, the need for the provincial government to further develop forest policy and identify a land base for industrial forestry relates to the issue of wood supply. Also, an improved comprehensive land-use planning system to allow for efficient multiple-use of forests is linked to issues of wood supply and some of the environmental concerns surrounding commercial fibre production.

Essentially, these discussions illuminated the very strong linkages between economic and environmental aspects of forests in Newfoundland. Although environmental aspects arise in most of the forestry issues, the first questionnaire results clearly indicated a need to list the environment as a separate issue. Most participants at the workshop were finally able to acknowledge and accept different points of view regarding forest sector issues and in particular, recognize the multiple outputs available from the forest.

Questions were raised about the remaining seven forest sector issues from the survey. Although only the top six issues could be discussed in detail at the workshop, the other issues were also viewed as important. Linkages between all 13 issues exist. For example, issue 12 (Inadequate adoption of new technology in forestry harvesting and processing), relates to fibre utilization and hence

Table 2. Survey ranking versus group ranking of the top six forest sector issues.

| Issue Number | Forest Sector Issue | Survey Ranking | Group Ranking |
|---|---|---|---|
| 1 | The effect of forestry practices (harvesting, processing, management) on the environment. | 1 | 3 |
| 3 | Loss of forests from fire, insects and disease. | 2 | 2 |
| 8 | Forest land alienation due to poor comprehensive land-use planning and a reliance on single-use rather than multiple-use management. | 3 | 3 |
| 2 | Uncertain situation of future wood supply versus demand, including pulpwood, sawlogs and fuelwood. | 4 | 1 |
| 4 | Inadequate understanding of intensive forest management practices for example site preparation, planting, seeding, thinning, prescribed burning, etc. | 5 | 3 |
| 10 | Need to improve and further develop forest legislation and policy relating to a number of issues such as land tenure, private woodlots, control over domestic cutting, and government funding in forestry. | 6 | 6 |

Table 3. Consensus ranking of the top six forest sector issues between survey and groups.

| Issue Number | Forest Sector Issue | Mean Score between Survey & Group Ranking |
|---|---|---|
| 1 | The effect of forestry practices (harvesting, processing, management) on the environment. | 2.0 |
| 3 | Loss of forests from fire, insects and disease. | 2.0 |
| 2 | Uncertain situation of future wood supply versus demand, including pulpwood, sawlogs and fuelwood. | 2.5 |
| 8 | Forest land alienation due to poor comprehensive land-use planning and a reliance on single-use rather than multiple-use management. | 3.0 |
| 4 | Inadequate understanding of intensive forest management practices for example site preparation, planting, seeding, thinning, prescribed burning, etc. | 4.0 |
| 10 | Need to improve and further develop forest legislation and policy relating to a number of issues such as land tenure, private woodlots, control over domestic cutting, and government funding in forestry. | 6.0 |

wood supply. Issue nine, (Inadequate species diversity in commercial forests and insufficient use of genetically improved stock), relates to the issues of wood supply and the effect of forestry on the environment.

Also, some of these lower ranking issues may become more important over time as present conditions in the forest change. For example, the effect of climatic change on the forest (relating to issue 7) may only emerge as a critical issue in a few decades. In addition, the development of the Labrador forest will likely become more important in the context of anticipated wood supply problems on the Island.

4.3.3 Elaboration of Potential NeFC Program Initiatives

The potential CFS initiatives were first elaborated upon by the sub-groups and then ranked. Each sub-group was assigned one issue (one sub-group had two issues) and the corresponding initiatives. This approach had a limitation in that not all issues were discussed by each sub-group. Time constraints precluded this method being used. In most cases, the sub-groups reorganized and added more detail to the list of initiatives. The salient points of the elaboration session are:

Issue 1. The effect of forestry practices (harvesting, processing, management) on the environment.

The topic of chemicals is very controversial. With herbicides, we may lack an adequate data base to make site-specific silvicultural prescriptions. With insecticides, issues include safety versus efficacy, impacts on non-target organisms, and in general, the topic of chemical versus non-chemical treatments. With respect to harvesting, problem areas are the loss of species diversity after replacing mixed stands with a single species, impacts on fish and wildlife, and nutrient depletion leading to site degradation. Some areas of possible research relate to terrain sensitivity analysis, development of alternative logging methods, and integrating environmental considerations into standard cost-benefit analyses in forest management. A strong need exists for harvesting guidelines. Research is needed to examine changes in carrying capacity for fish and wildlife, including birds, as a result of forestry practices, and in particular, access roads. Studies are required on the autecology of forest wildlife, and the impact of reductions in old-growth forest and forest fragmentation on various species of wildlife. A further concern is the environmental impact of physical pollutants such as wood waste, wood by-products and toxic mill effluents. The cumulative effect of pollutants on the environment is of paramount concern.

Issue 3. Loss of forests from fire, insects and disease.

The guiding principal in forest protection is prevention of losses with early action before problems become overwhelming in proportion. Early action can also reduce the environmental concerns from having to combat major problems, for example an insect epidemic, with a massive chemical spray program. A number of research initiatives were suggested. With insects and disease, research is needed to predict outbreaks, examine the effects of various control measures, and develop biological control methods. With fire, research is required to adapt detection and response

management systems to local conditions, examine the use of fire as a forest management tool, and develop an economic model to compare the costs of fire protection with values at risk. In a broader sense, research is needed on the pattern of ecological succession following forest damage, and the development of pest management systems as a component of forest management.

Issue 2. Uncertain situation of future wood supply versus demand, including pulpwood, sawlogs and fuelwood.

A principal requirement is to develop a definition of timber shortage as it relates to the land base and how the land base is used. The issue of physical versus economic wood shortages must be addressed. Timber supply models already exist, however CFS input, including research is needed to improve the data for these models. Examples include regeneration and stocking standards, growth and yield in managed stands, and the development of site specific silvicultural prescriptions in consultation with other agencies. Research is also required on the topic of increasing forest growth and yield through silviculture, protection of plantations, and increased fibre utilization.

Issue 8. Forest land alienation due to poor comprehensive land-use planning and a reliance on single-use rather than multiple-use management.

Seven primary sources of forest land alienation were identified: agriculture, municipal boundaries, hydro-electric development, highway right-of-way, environmentally sensitive areas, recreational areas including cottages, and parks and wilderness areas. These alternate land-uses need to be better understood as to how and why they affect a declining forest land-base. The CFS can play a role by increasing public awareness of forestry and the problem of forest land alienation. Also, research to develop economic models for the Province to apply in land-use planning is necessary. The authority of the Province in land-use policy and planning was recognized. In that regard however, the Province must develop a comprehensive land-use policy and, a mechanism to resolve conflicts and define land-use priorities. Alienation of forests also stems from poor integration of the forest industry in Newfoundland. The processing of smaller timber into lumber, and larger timber into newsprint represents an inefficient allocation of forest resources.

Issue 4. Inadequate understanding of intensive forest management practices, for example site preparation, planting, seeding, thinning, prescribed burning, etc.

This issue in theory includes all forest management from stand replacement to stand tending. A wide range of potential CFS initiatives were presented and discussed. With stand replacement, initiatives included research to better match scarification equipment and planting stock (species, size, type, etc.) to specific sites. Also, research is needed to determine the optimum spacing for planting. For natural regeneration, research is required to develop stocking standards and survey methodology. In the area of stand development, research needs were identified relating to stand structure, survival, growth responses in plantations and timing of spacing and growth responses in plantations according to

site conditions. The development of stands on sites cleared by fire should be examined. Research is also required in nurseries, for example development of seedling stock standards, seed orchards, genetically improved stock and experiments with exotic species, especially for use on poor sites. A number of potential research studies were suggested relating to site, including development of a site prescription manual for field staff, examining methods to reduce the effect of competing species, especially Kalmia, and improving our knowledge of nutrient cycling, site productivity and mycorrhizae.

Issue 10. Need to improve and further develop forest legislation and policy relating to a number of issues such as land tenure, private woodlots, control over domestic cutting and government funding in forestry.

This issue was recognized as a major concern in Newfoundland at present. Also, the workshop affirmed that forest policy and legislation are a Provincial responsibility and not under the mandate of the federal CFS. However, workshop participants also agreed that the NeFC has a supportive role to play in the development of forest policy and legislation when requested by the Province. This support could take the form of advice backed up by various economic studies and models. Also, in the area of funding, the CFS plays a key role by providing federal dollars for Provincial forest management programs through cost-shared agreements.

4.3.4 CFS Resource Constraints

The elaboration of potential initiatives was conducted from an ideal perspective of no resource constraints at NeFC. Following that session, a presentation was given by the Regional Director General of the CFS on the constraints to program activity at NeFC, both current and future. To summarize, financial and human resources at NeFC are now stretched to their limit in order to sustain current program levels. In the past several years, staff levels have been reduced from 76 to 70. Although the person-year complement of 70 will likely be maintained in the near future, increases are doubtful. More critical is the fact that financial resources, especially operational funds, have been severely constrained. The operational budget of NeFC has declined from over $1 million in 1983/84 to approximately $750,000 in 1988/89. Further, these cuts exclude the effect of inflation. Given the current atmosphere of restraint in Ottawa, restoration of the NeFC budget to earlier levels is unlikely.

Shifts in program direction will have to occur gradually as staff with specific expertise fill vacancies created by retirement, transfer or resignation. This process can be complemented by internal resource reallocation to focus on program priorities. An underlying point is that research programs take time to become established and productive. Sudden and frequent shifts in research priorities and program direction are ill-advised. Such a strategy is counterproductive to effective research and often leads to poor morale among scientists.

Any expansion of program effort can only occur through the use of external funding from various sources such as cost-shared forestry agreements, industry contributions for cooperative studies, and federal Department of Supply and Services contract money. While improvements in productivity at NeFC are

possible through expanded use of training and technology, these gains may only balance the growing pressure on programs as relatively fixed budgets are eroded by inflation.

A less obvious constraint is imposed by the nature of research and the process by which federal scientists are evaluated. As a general rule, scientists in any field strive to earn the respect of their peers. Becoming a well-known and well-respected scientist requires excellence in research with a strong record of publications in reputable scientific journals (Wolff, 1987). In the CFS, the performance review and appraisal of research scientists is based largely upon the record of publications each year (Cayford and Sullivan, 1985). Publications in prestigious scientific journals rate higher than information reports or brochures. Thus, for scientists at NeFC, career advancement as a scientist depends upon the number of publications produced each year, especially in highly regarded journals. Clearly, this fact does little to help the forester in the field who may not read scientific journals. Turning all NeFC scientists into technology transfer officers would increase the flow of information to field foresters, however this approach would yield results only in the short-term. In the long run, scientists would leave to find employment in an environment where research was emphasized. Also, not all research is directed to assisting the field forester. Other clients include more senior government officials and individuals in "non-forestry" agencies such as Parks Canada, Provincial Parks, Canadian Wildlife Service, etc. A compromise is necessary to ensure that scientists can practice research which will yield both scientific publications for career advancement, and information to address priority forest sector issues at various organizational levels and among a range of disciplines.

4.3.5 Ranking of Potential NeFC Program Initiatives

With a better knowledge of NeFC constraints, the sub-groups ranked the initiatives in order of priority. Some initiatives were further refined, others were discarded from the list. The priority list of suggested NeFC program initiatives is:

Issue 1. The effect of forestry practices (harvesting, processing, management) on the environment.

1. a) Research on site sensitivity mapping and the transfer of results to assist the Province in developing guidelines for forestry operations.

   b) Continuing cooperative research relating to the impact of chemicals on non-target terrestrial and aquatic organisms.

   c) Research on the carrying capacity of logged areas for wildlife to assist the Province in developing realistic harvesting guidelines for habitat protection and enhancement.

   d) Research on the impact of silvicultural practices on the environment.

2. a) Economics research on the impact of environmental damage from forestry operations.

   b) Research to assist the Province in developing guidelines for the protection of fish and wildlife habitat relating to harvesting timber from steep slopes.

c) Continued participation in environmental assessment committees.

e) Research on the impact of access road development on fish and wildlife.

Issue 3. Loss of forests from fire, insects and disease.

1. Research to predict forest insect and disease outbreaks and their effect on the forest resource based upon FIDS data.

2. Research and trials on the biological control of forest pests; natural mortality factors (predators, parasites), resistant host species; silvicultural techniques and biotechnology to control pests.

3. Research on the effects and side effects of various control measures.

4. Research on ecological succession associated with fire, insects and disease.

5. Development of pest management systems for overall forest management.

6. Research on the adaptation of forest fire management systems including early detection and response, and the economics of fire control versus losses in Newfoundland.

7. Research on the use of fire for site preparation and pest control, etc.

Issue 2. Uncertain situation of future wood supply versus demand, including pulpwood, sawlogs and fuelwood.

1. Assist the Province in developing a timber supply model through research and technology transfer as follows:

   a) Growth and yield information for managed stands.

   b) Development of regeneration stocking standards.

   c) Site classification relating to regeneration, succession, etc.

   d) Economic versus biological aspects of silviculture.

   e) Applied trials of alternative silvicultural treatments relating to site classification.

2. Improve the level of information on methods to increase forest growth through research, field trials and technology transfer relating to stand tending practices such as thinning, fertilization, etc.

Issue 8. Forest land alienation due to poor comprehensive land-use planning and a reliance on single-use rather than multiple-use management.

1. Promote public perception and awareness of the limited provincial forest resource.

2. Develop economic models to address questions relating to integrated logging and transportation of various fibre products.

Issue 4. Inadequate understanding of intensive forest management practices, for example site preparation, planting, seeding, thinning, prescribed burning, etc.

More Important:

1. Site preparation and planting:

   a) Development of stocking standards and survey methods for field use.

   b) Research on Kalmia control.

2. Stand tending:

   a) Research to address the problem of competing vegetation in plantations (other than Kalmia).

   b) Research to control the problem of insect and disease losses in plantations.

3. Nurseries:

   a) Development of seedling stock standards.

   b) Research, field trials and technology transfer relating to tree improvement, for example seed orchards.

   c) Mycorrhizal research.

Less Important:

1. Site preparation and planting:

   a) Research to better match species to site conditions.

   b) Development of a site prescription manual for use in the field.

   c) Research relating to plantation spacing.

   d) Research and trials relating to exotic species for poor sites.

   e) Research relating to reforestation and stand development following fire.

   f) Research and trials to better match site preparation equipment to site conditions.

2. Stand tending:

   a) Research on growth responses in plantations.

b) Research on general stand development including stand structure, optimum timing of treatments and growth response to various treatments.

c) Research on nutrient cycling relating to site productivity.

Issue 10. Need to improve and further develop forest legislation and policy relating to a number of issues such as land tenure, private woodlots, control over domestic cutting and government funding in forestry.

1. This issue and the various sub-issues are extremely important, however the federal role via NeFC must be one of advice and consultation as requested by the Province. The need for continued federal funding, however, is paramount in the overall picture of forestry in Newfoundland.

Only a general comparison between the group and survey rankings of the suggested NeFC program initiatives is possible because of the reorganization of initiatives by the five sub-groups. For issues 1. The effect of forestry practices on the environment; 2. Uncertain situation of future wood supply versus demand; 3. Loss of forests from fire, insects, and disease; and 4. Inadequate understanding of intensive forest management practices, the top ranking initiatives from the workshop show many parallels to those from the survey. The wording of the survey initiatives was often modified by the sub-groups, but the priorities are similar in both sets of data for these particular issues. The CFS can play an important role in addressing these issues. A comparison of ranking of initiatives for the other two issues (8. Forest land alienation, etc., and 10. Forest legislation and policy, etc.) is impossible. Generally, the workshop participants indicated that the CFS can play only an indirect role in addressing these issues except for the question of funding, which is critically important.

Four common points were evident during the presentation and discussion of the group ranking for the initiatives. First, as the CFS refines its program direction, consultation with client agencies should continue. Mechanisms for consultation include the Forest Research Advisory Committee (FRAC) and various technical sub-committees associated with the current federal-provincial Forest Resource Development Agreement (FRDA). A suggestion was to ensure that researchers are members of these technical sub-committees. Second, the question of federal funding cropped up repeatedly in the presentations by the workshop sub-groups. The need for continued federal funding in most areas of forestry was emphasized, for example the Forest Insect and Disease Survey (FIDS), and ongoing Provincial forest management, such as planting, thinning and access roads. Also, a conclusion by many participants was that in future cost-shared forestry agreements, more funding should be channeled to forest research, both to the CFS directly, and through contracts to other agencies such as Memorial University. Third, in recognition that NeFC cannot undertake research in all fields, cooperative research with other agencies might be expanded in the future. Examples include joint studies oriented toward environmental issues with provincial and federal Departments of Environment, Wildlife, Parks, etc. The fourth point is that research must include a mechanism to transfer the results to clients in a readily understandable form. Depending upon the issue, the research client can range from senior government or industry executives to foresters in the field. This whole area of technology transfer is fundamental in ensuring that NeFC's programs successfully address client needs.

One point raised at the workshop was the relationship between regional and national CFS research priorities. Comparing the national priorities (Section 2.2) with regional issues and proposed NeFC initiatives indicates no major digressions. Thus, regional priorities in research tend to fall within the broader national priorities.

## 5.0 SUMMARY

The Delphi survey and follow-up workshop were very helpful in identifying the key forest sector issues in the province and program priorities for NeFC to address these issues. Thirteen forest sector issues and 76 program initiatives were identified, priorized and discussed. The Delphi survey provided input from individuals representing a wide range of forestry-related professions, expertise and interests. The workshop provided input from these same individuals, but in a group setting. A comparison of input from both approaches yielded a general consensus on priority issues and potential NeFC program initiatives.

The reader should not be given the impression that all participants left the workshop in full agreement. Differences in individual opinions over the ranking of issues still remained; however, the workshop did develop a group viewpoint to a large degree.

The most critical issues facing the forest sector relate to wood supply and environmental concerns surrounding commercial forestry practices. With the former issue, the principal NeFC program priorities center around research and technology transfer associated with timber supply modelling, and protecting the forest from fire, insects, and disease. With the latter issue, program priorities relate to site sensitivity mapping, development of harvesting guidelines which recognize and protect non-timber values, and examining the impact of chemicals on non-target organisms. Although the workshop elaborated upon six key issues, all 13 issues were viewed as important.

The key issues identified are of immediate and future concern. Some of the suggested research and development initiatives are already being undertaken by NeFC. However, gradual shifts in program direction will be necessary over time to address certain issues. Resource constraints in the CFS, including NeFC, rule out significant expansion of program scale. A fundamental issue relating to financial resources is the need for sustained funding of forestry activities in the province, specifically for research and forest management. The importance of cost-shared forestry agreements as a source of funding was recognized by all participants.

The information collected in the survey and workshop will allow NeFC senior management to make informed decisions concerning the strategic direction of the lab for the next five to ten years. These decisions will require continued dialogue with client agencies and NeFC scientists to ensure that long-term program direction and content will address the key forest sector issues. Such dialogue will also open the door for greater cooperation in research between NeFC and other agencies. The survey and workshop have provided a basic foundation to build upon.

The issues and NeFC initiatives derived from the survey and workshop are specific to Newfoundland, yet they fit into the broader national priorities of the CFS. Therefore, by using the information in this report as a general guide in setting long term programming at NeFC, regional and national priorities will not diverge.

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## APPENDIX 1

## SURVEY POPULATION

1) Dr. M. Nazir
Assistant Deputy Minister
Department of Forestry
St. John's, NF

2) Mr. G. Ross
Director of Silviculture
Department of Forestry
Corner Brook, NF

3) Mr. R. Mercer
Director of Forest Management
Department of Forestry
Corner Brook, NF

4) Mr. G. Fleming
Director - Forest Protection
and Access Roads
Department of Forestry
Corner Brook, NF

5) Mr. E. Blackmore
Supervisor - Forestry, Central Region
Department of Forestry
Gander, NF

6) Mr. A. Masters
Supervisor - Forestry, Western Region
Department of Forestry
Corner Brook, NF

7) Mr. C. John
Director, Eastern Region
Department of Forestry
St. John's, NF

8) Mr. K. Colbert
Director, Labrador Region
Department of Forestry
Goose Bay, Labrador

9) Dr. J. Munro
Regional Director General
Canadian Forestry Service
Newfoundland Forestry Centre
St. John's, NF

10) Dr. J. Hudak
Director
Forest Protection Research and
Technical Services
Canadian Forestry Service
Newfoundland Forestry Centre
St. John's, NF

11) Mr. D. Rex
Manager
Information Services and Technology
Transfer
Canadian Forestry Service
Newfoundland Forestry Centre
St. John's, NF

12) Mr. M. Butler
Program Director, Development
Canadian Forestry Service
Newfoundland Forestry Centre
St. John's, NF

13) Dr. W. Meades
Research Scientist
Canadian Forestry Service
Newfoundland Forestry Centre
St. John's, NF

14) Mr. R. van Nostrand
Director
Forest Resources Research and
Technical Services
Canadian Forestry Service
Newfoundland Forestry Centre
St. John's, NF

15) Mr. R. Angel
Manager
Finance and Administration
Canadian Forestry Service
Newfoundland Forestry Centre
St. John's, NF

16) Dr. I. Thompson
Research Scientist
Canadian Forestry Service
Newfoundland Forestry Centre

17) Dr. B. Titus
Research Scientist
Canadian Forestry Service
Newfoundland Forestry Centre
St. John's, NF

18) Dr. A. Robertson
Research Scientist
Canadian Forestry Service
Newfoundland Forestry Centre
St. John's, NF

19) Dr. P. Dixon
Research Scientist
Canadian Forestry Service
Newfoundland Forestry Centre
St. John's, NF

20) Dr. M. Lavigne
Research Scientist
Canadian Forestry Service
Newfoundland Forestry Centre
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21) Dr. A. Raske
Research Scientist
Canadian Forestry Service
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22) Dr. L. Carlson
Director, Research
Canadian Forestry Service
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23) Mr. I. Goudie
Wildlife Biologist
Canadian Wildlife Service
St. John's, NF

24) Mr. R. McCubbin
Fisheries - Environment Coordinator
Department of Fisheries and Oceans
St. John's, NF

25) Mr. D. Wells
President
Nfld. Lumber Producers Association
Glovertown, NF

26) Dr. D. Bajzak
Dept. of Engineering
Memorial University of Nfld.
St. John's, NF

27) Mr. K. Proudfoot
Acting Director
Agriculture Canada
St. John's, NF

28) Mr. H. Deichmann
Park Ecologist
Gros Morne National Park
Gros Morne, NF

29) Mr. Dave Quinton
Senior Producer - Land & Sea
Canadian Broadcasting Corporation
St. John's, NF

30) Mr. J. Osborne
Manager - Environmental Quality and Assessment
Environment Protection Service
Environment Canada
St. John's, NF

31) Mr. D. Taylor
Director of Environmental Assessment
Dept. of Environment & Lands
St. John's, NF

32) Mr. D. Hustins
Director of Parks
St. John's, NF

33) Mr. J. Inder
Assistant Deputy Minister
Dept. of Culture, Recreation & Youth
St. John's, NF

34) Ms. J. Harding
Newfoundland Wilderness Society
St. John's, NF

35) Dr. G. Bennett
Dept. of Biology
Memorial University of Nfld.
St. John's, NF

36) Dr. W.J. Carroll
Former Director General (NeFC)
- retired
Glovertown, NF

37) Mr. G. van Dusen
Chief Forester
Corner Brook Pulp & Paper Ltd.
Corner Brook, NF

38) Mr. B. Furey
Chief Forester
Abitibi-Price Inc.
Grand Falls, NF

## APPENDIX 2

## STRATEGIC PLANNING FOR RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER AT NeFC

### QUESTIONNAIRE 1

Code: _____

1. Please check or write-in the appropriate responses to the following questions regarding your current professional role.

   a). Employer:

   1. _____ Federal Government
   2. _____ Provincial Government
   3. _____ Private Industry/Crown Corporation
   4. _____ University/College
   5. _____ Other (specify)_____

   b). Professional Role: (Check the most appropriate response)

   1. _____ Senior Forest Manager
   2. _____ Forester
   3. _____ Researcher
   4. _____ Administrator/Manager
   5. _____ Planner
   6. _____ Academic/Teacher
   7. _____ Other (specify) _____

2. This question serves two central purposes, first to identify key strategic issues which you feel may impact upon the Newfoundland forest sector in the next 5 to 10 years, and second, to determine which of these issues may be addressed by the Newfoundland Forestry Centre through research, development and technology transfer programs.

Initially, in the left-hand column, list the key forest sector issues that you feel may be of critical importance in the province in the next 5 to 10 years. These issues may already exist or they may only emerge over the next several years. Please list these issues without thinking about whether they can or even should be addressed by the CFS. Your list can be short or long; if necessary use extra paper. Also, the issues should be broadly defined and can cover the full spectrum of forestry from the forest land base to final demand for an array of outputs. Therefore, consider social, economic and institutional dimensions of forestry.

Once you have completed your list of key long-term sector issues in the left-hand column, fill in the right-hand column. For each key issue identified, first assess whether or not it should be addressed by the CFS. If not, check **NO** in the blank opposite the issue. If **YES**, then suggest how the CFS can address the issue through research, development, and technology transfer programs. Your ideas may include only one activity, for example research, or include some combination of research, development, and technology transfer programs. Rather than describing specific studies, indicate broad program thrusts or initiatives. If you are unsure whether the CFS should address a particular issue, simply check the ? as your entry, then add your idea on how the issue could be addressed through broad research, development and technology transfer programs.

To help you in filling out the middle and right-hand columns below, Page 5 of this questionnaire provides information on the CFS mission and mandate to Newfoundland and Labrador.

| Key Long-Term Forest Sector Issue | Should CFS Address This Issue? NO | YES | ? | Suggested CFS Thrust in Research, Development, Tech. Transfer |
|---|---|---|---|---|
| 1 _____ | ____ | ____ | ____ | _____ |
| _____ | | | | _____ |
| 2 _____ | ____ | ____ | ____ | _____ |
| _____ | | | | _____ |
| 3 _____ | ____ | ____ | ____ | _____ |
| _____ | | | | _____ |

| Key Long-Term Forest Sector Issue | Should CFS Address This Issue? NO | YES | ? | Suggested CFS Thrust in Research, Development, Tech. Transfer |
|---|---|---|---|---|
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |
| 13 | | | | |

3. The next questionnaire will provide an opportunity to evaluate and rate the collective responses from all participants in this first questionnaire. Your opinion is needed on which criteria should be used to rate or priorize long-term strategic forest sector issues, and by implication, future CFS thrusts in research, development and technology transfer.

   Three possible criteria are listed below. Use the space provided to comment or elaborate on these criteria if necessary. Also, you can add additional criteria at the bottom. Then, using the 5-point scale to the right, indicate the level of importance you would assign to each criteria (1 = Very Low; 5 = Very High).

| Criteria | Importance Rating | | | | |
|---|---|---|---|---|---|
| | Very Low 1 | 2 | 3 | 4 | Very High 5 |
| a) Potential Economic Impact | 1 | 2 | 3 | 4 | 5 |
| _____ | | | | | |
| _____ | | | | | |
| b) Potential Social Impact | 1 | 2 | 3 | 4 | 5 |
| _____ | | | | | |
| _____ | | | | | |
| c) Potential Environmental Impact | 1 | 2 | 3 | 4 | 5 |
| _____ | | | | | |
| _____ | | | | | |
| d) Other (specify) | 1 | 2 | 3 | 4 | 5 |
| _____ | | | | | |
| _____ | | | | | |

**THANK YOU FOR YOUR CONTRIBUTION. PLEASE RETURN THIS QUESTIONNAIRE IN THE ENVELOPE PROVIDED BEFORE APRIL ( ), 1988. THE RESULTS WILL BE PROMPTLY PROCESSED AND USED TO DEVELOP THE SECOND QUESTIONNAIRE.**

## THE CFS IN NEWFOUNDLAND AND LABRADOR

### Background

Under the terms of union by which Newfoundland joined Confederation in 1949, the federal government established a forest research facility in the province. The NeFC is one of six federal regional forestry research centres in Canada within the CFS. In addition, the CFS operates two national forest research institutes. The role of NeFC has evolved from primarily research, to include a regional development responsibility. The laboratory and a research greenhouse are located in the capital of St. John's. Small seasonal field stations are situated in western and central regions of the Island.

### The CFS Mission and Mandate

From the Canada Forest Research and Development Act of 1966-67, Cabinet and Privy Council Directives (1979, 1981, 1984), the overall mission of the CFS is:

> The CFS provides national leadership in the development, coordination and implementation of the federal policies and programs to enhance long-term economic, social and environmental benefits to Canadians from the forest sector.

While appropriate for the CFS at the national level, this mission statement is too broad for effective regional strategic planning. The current mission statement for NeFC is:

> The NeFC of the CFS is the lead federal agency in Newfoundland and Labrador responsible for:
> - conducting forestry research to produce scientific and technical knowledge,
> - managing forestry development agreements and other related programs,
> - disseminating scientific and technical information, and
> - providing forest policy advisory services,
>
> to enhance the economic, environmental and social benefits from the forest resources in the region. The principal clients are the provincial, federal and private forestry related agencies, the scientific community, educational institutions and the general public. The programs of NeFC are designed to have a significant impact on the forest sector, primarily in the region, and contribute to national and international knowledge in forestry.

The NeFC mission statement reflects the general mandate of the CFS to conduct forestry research and, negotiate and fund forestry development agreements in association with provincial government objectives and policies. This mandate clearly recognizes the constitutional authority of the provincial government over forest resource ownership, management and administration.

APPENDIX 3

**STRATEGIC PLANNING FOR RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER AT NEPC**

Code: _____

**QUESTIONNAIRE 2**

Background: Results From Questionnaire #1

The previous questionnaire was sent to 38 individuals representing a cross section of opinion. A total of 34 questionnaires were returned. The questionnaires provided basic background information on survey participants, a number of long-term forest sector issues, and a wide range of possible CFS initiatives to address the issues.

To analyze the results, the responses were grouped into 13 main issues. The various CFS initiatives in research, development and technology transfer were then allocated among the 13 main issues. Therefore, the first questionnaire provided input to develop a list of 13 key long-term forest sector issues, and a list of CFS initiatives for each issue.

The first questionnaire also asked respondents to select criteria for rating a future list of forestry issues. Of the three criteria presented, and a few others suggested by respondents, two were given the highest scores by the majority of respondents. These criteria were potential economic impact and potential environmental impact.

Questionnaire #2

The objective of this current questionnaire is to priorize the list of forest sector issues, and within each issue, priorize among alternative CFS initiatives in research, development and technology transfer. Please recall that development refers to activities under Federal-Provincial forestry agreements (Development Agreements). Also, technology transfer should be implied for all research initiatives. In some cases however, where the majority of respondents specifically identified technology transfer for an issue, technology transfer is listed as a separate initiative. The initiatives listed for each issue reflect a majority of opinion that CFS should undertake some aspect of the work. To complete questionnaire #2, please do the following:

1. Begin with Part A.
2. Review Part A, and then rate each of the 13 key long-term forest sector issues in terms of potential economic impact, and potential environmental impact.
3. Proceed to Part B.
4. Review the material in Part B.
5. For each issue, rate the possible CFS initiatives listed in terms of the urgency and importance of the work relative to the issue.
6. Return your completed questionnaire in the enclosed self-addressed, post-paid envelope by May 27th, 1988.

**PART A**

In this section, please do the following:

1. Review the 13 long-term forest sector issues,
2. Rate each issue using the two criteria of potential economic impact and potential environmental impact,
3. When finished, please proceed to Part B of the questionnaire.

| KEY LONG-TERM FOREST SECTOR ISSUE IN NEWFOUNDLAND AND LABRADOR | POTENTIAL ECONOMIC IMPACT OF THE ISSUE | | | | | POTENTIAL ENVIRONMENTAL IMPACT OF THE ISSUE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Very Low | | | | Very High | Very Low | | | | Very High |
| 1. The effect of forestry practices (harvesting, processing, management) on the environment. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 2. Uncertain situation of future wood supply versus demand, including pulpwood, sawlogs, and fuelwood. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 3. Loss of forests from fire, insects and disease. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 4. Inadequate understanding of intensive forest management practices, for example site preparation, planting, seeding, thinning, prescribed burning, etc. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 5. Lack of development of the Labrador forest | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 6. Inadequate information on our forest land base and forest resource inventory. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 7. Effect of climate and acid rain on our forests. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

| KEY LONG-TERM FOREST SECTOR ISSUE IN NEWFOUNDLAND AND LABRADOR | POTENTIAL ECONOMIC IMPACT OF THE ISSUE | | | | | POTENTIAL ENVIRONMENTAL IMPACT OF THE ISSUE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Very Low | | | | Very High | Very Low | | | | Very High |
| 8. Forest land alienation due to poor comprehensive land-use planning and a reliance on single-use rather than multiple-use management. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 9. Inadequate species diversity in our commercial forests and insufficient use of genetically improved stock. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 10. Need to improve and further develop forest legislation and policy relating to a number of issues such as land tenure, private woodlots, control over domestic cutting, and government funding in forestry. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 11. Poor diversity in forest products and markets in Newfoundland. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 12. Inadequate adoption of new technology in forestry harvesting and processing in Newfoundland. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 13. Inadequate communication and education within the forestry sector, and between the forestry sector and the general public. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

**PART B**

In this section, please do the following:

1. Review the possible CFS initiatives in research, development and technology transfer within each issue.

2. For each issue, rate the possible CFS initiatives using the two criteria of
   a) urgency (how urgent is the activity in relation to the issue?)
   b) importance (expected contribution of the activity to address the issue).

| KEY LONG-TERM FOREST SECTOR ISSUE AND POTENTIAL CFS INITIATIVES IN RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER | URGENCY OF THE CFS INITIATIVES | | | | | IMPORTANCE OF THE CFS INITIATIVES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Very Low | | | | Very High | Very Low | | | | Very High |
| **1. The effect of forestry practices (harvesting, processing, management) on the environment.** | | | | | | | | | | |
| a) research on the impact of chemicals and site disturbance on terrestrial and aquatic ecosystems. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) research on the impact of silviculture on the environment | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| c) research on the impact of pollutants from forestry practices on the environment | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| d) research on environmental damage from logging steep slopes | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| e) research on matching site sensitivity to harvesting practices | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

| KEY LONG-TERM FOREST SECTOR ISSUE AND POTENTIAL CFS INITIATIVES IN RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER | URGENCY OF THE CFS INITIATIVES | | | | | IMPORTANCE OF THE CFS INITIATIVES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Very Low | | | | Very High | Very Low | | | | Very High |
| f) research on the economic impact of environmental damage | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| g) technology transfer of research to develop realistic harvesting guidelines for habitat protection and enhancement | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| h) technology transfer of expertise to assess management plans in terms of environmental impacts | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| i) research on developing impact minimizing forestry practices which allow economic production of commercial timber. | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **2. Uncertain situation of future wood supply versus demand, including pulpwood, sawlogs, and fuelwood.** | | | | | | | | | | |
| a) research and technology transfer to develop a provincial timber supply model which will highlight the timing and severity of future wood shortages, and account for various human and natural forest depletions and accruals (fire, insects, harvesting, silviculture, browsing, etc.) | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) continued funding from Development Agreements for silviculture | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| c) funding from Development Agreements for research, related to increasing future wood supplies | | | | | | | | | | |
| d) research on the economics of improved fibre utilization | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| e) funding for improved training for loggers to increase fibre utilization during harvesting | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

| KEY LONG-TERM FOREST SECTOR ISSUE AND POTENTIAL CFS INITIATIVES IN RESEARCH, DEVELOPMENT AND TECHNOLOGY | URGENCY OF THE CFS INITIATIVES | | | | | IMPORTANCE OF THE CFS INITIATIVES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Very Low | | | | Very High | Very Low | | | | Very High |
| f) research on methods to increase forest growth | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| g) research on afforestation on the Avalon and E. Coast to increase fuelwood supplies | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| h) research on the impact of intensive management on economic wood supply | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **3. Loss of forests from fire, insects and disease.** | | | | | | | | | | |
| a) continuing to provide expertise and personnel for the Forest Insect and Disease Survey (FIDS) | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) research on the economics of fire control versus potential losses | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| c) research to predict forest insect outbreaks and the effect of various control measures | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| d) research and technology transfer on the control and prevention of forest insects and diseases | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| e) research and trials on non-chemical control of forest insects | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| f) funding protection research under Development Agreements | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| g) research on forest fire control | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| h) research on the ecological changes associated with forest losses from fire, insects and diseases | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

| KEY LONG-TERM FOREST SECTOR ISSUE AND POTENTIAL CFS INITIATIVES IN RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER | URGENCY OF THE CFS INITIATIVES | | | | | IMPORTANCE OF THE CFS INITIATIVES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Very Low | | | | Very High | Very Low | | | | Very High |
| **4. Inadequate understanding of intensive forest management practices, for example site preparation, planting, seeding, thinning, prescribed burning, etc.** | | | | | | | | | | |
| a) research and technology transfer to increase the efficiency and effectiveness of various intensive forest management practices | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) development of a site manual | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| c) research on Kalmia control | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| d) research to improve nursery seedling production and develop nursery stock standards | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| e) research on site competition following disturbance | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| f) technology transfer of mycorrhizal research | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| g) research to assess the impact of various management strategies on nutrient cycling and site productivity | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| h) provide funding to Memorial University for biological research | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **5. Lack of development of the Labrador forest.** | | | | | | | | | | |
| a) funding under Development Agreements for promotion of the resource and building necessary infrastructure | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) research and technology transfer to complement ongoing forest management in Labrador | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| c) research to explore potential for integrating the Labrador resource and the Island's forest industry | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

| KEY LONG-TERM FOREST SECTOR ISSUE AND POTENTIAL CFS INITIATIVES IN RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER | URGENCY OF THE CFS INITIATIVES | | | | | IMPORTANCE OF THE CFS INITIATIVES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Very Low | | | | Very High | Very Low | | | | Very High |
| **6. Inadequate information on our forest land base and forest resource inventory.** | | | | | | | | | | |
| a) research and technology transfer to develop improved volume tables, and a growth and yield model for estimating yields from natural and managed forest stands | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) research to quantify the area of not sufficiently restocked (NSR) land, and the area of land available to practice commercial forestry | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| c) development of regeneration stocking standards and survey methods | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| d) research and technology transfer on digital terrain mapping | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| e) develop methods to identify unique forests which should be preserved for ecological reasons | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| f) research on forest stand structure | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| g) technology transfer of satellite imagery to ecological land classification | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| h) research on forest response following planting and thinning | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| i) technology transfer and funding from Development Agreements to further improve and expand the computerized forest inventory data base, including the use of Geographic Information Systems (GIS) | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| j) research on site classification to assist in the utilization of peatlands | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

| KEY LONG-TERM FOREST SECTOR ISSUE AND POTENTIAL CFS INITIATIVES IN RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER | URGENCY OF THE CFS INITIATIVES | | | | | IMPORTANCE OF THE CFS INITIATIVES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Very Low | | | | Very High | Very Low | | | | Very High |
| **7. Effect of climate and acid rain on our forests.** | | | | | | | | | | |
| a) research on the effect of long-term climatic change on forest growth in Newfoundland | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) research on acid rain and its impact of forests | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **8. Forest land alienation due to poor comprehensive land-use planning and a reliance on single-use rather than multiple-use management.** | | | | | | | | | | |
| a) research on the economics of comparative land uses | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) development of economic models to assist in long-term land-use planning for multiple outputs | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| c) research on the economic value of non-timber forest uses such as recreation | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| d) research and technology transfer to integrate non-forestry concerns into forestry management plans | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **9. Inadequate species diversity in our commercial forests and insufficient use of genetically improved stock.** | | | | | | | | | | |
| a) research on the biological and economic potential for expanding industrial consumption of forest biomass and satisfying domestic fuelwood needs | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) research to expand species diversity in commercial forests by using "exotic" non-native species | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

| KEY LONG-TERM FOREST SECTOR ISSUE AND POTENTIAL CFS INITIATIVES IN RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER | URGENCY OF THE CFS INITIATIVES | | | | | IMPORTANCE OF THE CFS INITIATIVES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Very Low | | | | Very High | Very Low | | | | Very High |
| c) research to develop insect and disease resistant trees | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| d) research and technology transfer to better match tree species to various site conditions | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| e) research and technology transfer to develop seed orchards for tree improvement and breeding research | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| f) transfer of research results on biotechnology and genetic engineering to Newfoundland | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **10. Need to improve and further develop forest legislation and policy relating to a number of issues such as land tenure, private woodlots, control over domestic cutting, and government funding in forestry.** | | | | | | | | | | |
| a) research on the economic implications of various forest policies | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) research on the economic value of timber for different uses e.g. pulpwood vs. sawlogs vs. fuelwood | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| c) research and advisory services on forest tenure and the allocation of timber supplies | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| d) research and advisory services to help develop policies and programs for improving the control of cutting on untenured Crown forests i.e.(coastal forests) | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

| KEY LONG-TERM FOREST SECTOR ISSUE AND POTENTIAL CFS INITIATIVES IN RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER | URGENCY OF THE CFS INITIATIVES | | | | | IMPORTANCE OF THE CFS INITIATIVES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Very Low | | | | Very High | Very Low | | | | Very High |
| e) research and technology transfer to develop economic models for allocating silviculture funds among the Forest Management Units based on various criteria | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| f) research and technology transfer to help develop policies and programs for private woodlots and community forests | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| g) support federal policies to continue funding forestry activities through Development Agreements, including research | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| h) support third party evaluations of Development Agreements to generate objective information for forestry planning in Newfoundland | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **11. Poor diversity in forest products and markets in Newfoundland.** | | | | | | | | | | |
| a) research and technology transfer to develop markets for insect and fire-killed timber, hardwoods, specialty softwoods species such as larch, forest residues, and trees removed during pre-commercial thinning | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) research and technology transfer to promote integrated harvesting of pulpwood, sawlogs and fuelwood | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| c) funding through Development Agreements to promote the use of local lumber | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| d) research to determine the potential for Christmas tree production in Newfoundland | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

| KEY LONG-TERM FOREST SECTOR ISSUE AND POTENTIAL CFS INITIATIVES IN RESEARCH, DEVELOPMENT AND TECHNOLOGY TRANSFER | URGENCY OF THE CFS INITIATIVES | | | | | IMPORTANCE OF THE CFS INITIATIVES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Very Low | | | | Very High | Very Low | | | | Very High |
| **12. Inadequate adoption of new technology in forestry harvesting and processing in Newfoundland.** | | | | | | | | | | |
| a) technology transfer of information to improve the efficiency of harvesting methods | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) technology transfer of information to improve the efficiency of sawmills in the province | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **13. Inadequate communication and education within the forestry sector, and between the forestry sector and the general public.** | | | | | | | | | | |
| a) research and transfer of information to improve public knowledge of forest management and the importance of forestry in this province | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| b) provide funding through Development Agreements to improve the level of training among forestry workers, e.g. in logging, silviculture, etc., through field trials, workshops and seminars | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| c) research to gather information on public awareness of forestry, and public concerns with forestry | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| d) support increased liaison between CFS and industry and Dept. of Forestry | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

## APPENDIX 4

## BACKGROUND OF RESPONDENTS TO THE FIRST QUESTIONNAIRE

| Employer | Number | Percent of Total |
|---|---|---|
| Federal Government | 19 | 54 |
| Provincial Government | 9 | 26 |
| Private Industry/Crown Corporation | 3 | 9 |
| University/College | 3 | 9 |
| Other | 1[a] | 3 |
| TOTAL | 35 | 101[b] |

[a] Self-employed

[b] Total percent does not equal 100 due to rounding

| Professional Role | Number | Percent of Total |
|---|---|---|
| Senior Forest Manager | 5 | 14 |
| Forester | 2 | 6 |
| Researcher | 8 | 23 |
| Administrator/Manager | 14 | 40 |
| Planner | 0 | 0 |
| Academic/Teacher | 3 | 9 |
| Other | 3[c] | 9 |
| | 35 | 101[d] |

[c] - Resource advisor - ecologist
- Fisheries biologist with experience in forestry sector
- T.V. producer

[d] Total percent does not equal 100 due to rounding

## APPENDIX 5

**STATISTICAL INFORMATION FOR RATING OF PROPOSED CRITERIA TO RANK FOREST SECTOR ISSUES FROM THE 35 RESPONDENTS TO QUESTIONNAIRE 1.**

| Criterion | Arithmatic Mean 1 | Standard Error | Standard Deviation | Range |
|---|---|---|---|---|
| Potential Environmental Impact | 4.25 | 0.150 | 0.737 | 2 - 5 |
| Potential Economic Impact | 4.17 | 0.143 | 0.702 | 3 - 5 |
| Potential Social Impact | 3.71 | 0.165 | 0.806 | 2 - 5 |
| Other | 3.33 | 0.118 | 0.577 | 3 - 5 |

[1] Note: Criteria were scored on a 5 point scale with 1 being lowest and 5 being highest.

## APPENDIX 6

### RANKING OF ISSUES BY ECONOMIC AND ENVIRONMENTAL IMPACTS

| COMBINED SCORE | ISSUE | ECONOMIC IMPACT | | | ENVIRONMENTAL IMPACT | | |
|---|---|---|---|---|---|---|---|
| | | MEAN | RANKING | S.D.* | MEAN | RANKING | S.D.* |
| 4.08 | 1. The effect of forestry practices (harvesting, processing, management) on the environment. | 3.78 | 4 | 0.99 | 4.38 | 1 | 0.88 |
| 3.73 | 3. Loss of forests from fire, insects, and disease | 4.30 | 2 | 0.94 | 3.15 | 5 | 1.18 |
| 3.66 | 8. Forest land alienation due to poor comprehensive land-use planning and a reliance on single-use rather than multiple-use management. | 3.85 | 3 | 1.23 | 3.46 | 2 | 0.97 |
| 3.65 | 2. Uncertain situation of future wood supply versus demand, including pulpwood, sawlogs, and fuelwood | 4.52 | 1 | 0.74 | 2.78 | 7 | 1.34 |
| 3.32 | 4. Inadequate understanding of intensive forest management practices for site preparation, planting, seeding, thinning, prescribed burning, etc. | 3.32 | 11 | 1.19 | 3.32 | 4 | 1.12 |
| 3.26 | 10. Need to improve and further develop forest legislation and policy relating to a number of issues such as land tenure, private woodlots control over domestic cutting, and government funding in forestry. | 3.67 | 6 | 1.12 | 2.85 | 6 | 1.30 |
| 3.13 | 12. Inadequate adoption of new technology in forestry harvesting and processing in Newfoundland. | 3.52 | 7 | 0.74 | 2.74 | 8 | 0.97 |
| 3.11 | 7. Effect of climate and acid rain on our forest. | 2.89 | 13 | 1.23 | 3.33 | 3 | 1.47 |
| 3.06 | 9. Inadequate species diversity in our commercial forests and insufficient use of gentically improved stock. | 3.44 | 8 | 0.96 | 2.67 | 10 | 1.09 |

* Standard deviation from the mean.

APPENDIX 6 (Cont'd ...)

| COMBINED SCORE | ISSUE | ECONOMIC IMPACT | | | ENVIRONMENTAL IMPACT | | |
|---|---|---|---|---|---|---|---|
| | | MEAN | RANKING | S.D.* | MEAN | RANKING | S.D.* |
| 2.89 | 6. Inadequate information on our forest land base and forest resource inventory. | 3.33 | 10 | 0.98 | 2.44 | 11 | 1.30 |
| 2.87 | 11. Poor diversity in forest products and markets in Newfoundland | 3.74 | 5 | 0.80 | 2.00 | 13 | 0.98 |
| 2.87 | 13. Inadequate communication and education within the forestry sector, and between the forestry sector and the general public. | 3.04 | 12 | 1.10 | 2.70 | 9 | 1.12 |
| 2.80 | 5. Lack of development of the Labrador forest | 3.33 | 9 | 0.98 | 2.26 | 12 | 1.04 |

## APPENDIX 7

## CALCULATION OF RHO FOR THE 13 FOREST SECTOR ISSUES.

$$\text{Rho} = 1 - \frac{\Sigma d^2}{N^3 - N}$$

where d = difference in ranking number for each issue using each criterion

N = number of issues

$$1 - \frac{289}{13^3 - 13} = 0.21$$

Value of 0.21 indicates low degree of correlation between the ranking of issues using the criteria of potential environmental and economic impacts.

APPENDIX 8

**FINAL RANKING OF CFS INITIATIVES**

**Ranking of potential CFS initiatives for the 13 key forest sector issues, based on urgency and importance.**

| Combined Mean Score | Forest Sector Issue and Potential CFS Initiatives | Mean Urgency Score | Mean Importance Score |
|---|---|---|---|
| | **1. The effect of forestry practices (harvesting, processing, management) on the environment.** | | |
| 3.80 | a) research on the impact of chemicals and site disturbance on terrestrial and aquatic ecosystems. | 3.82 | 3.78 |
| 3.54 | b) technology transfer of research to develop realistic harvesting guidelines for habitat protection and enhancement. | 3.59 | 3.48 |
| 3.47 | c) research on matching site sensitivity to harvesting practices. | 3.41 | 3.52 |
| 3.39 | d) research on the impact of silviculture on the environment | 3.41 | 3.37 |
| 3.39 | e) research on developing impact minimizing forestry practices which allow economic production of commercial timber. | 3.46 | 3.32 |
| 3.28 | f) research on the economic impact of environmental damage. | 3.26 | 3.30 |
| 3.21 | g) research on environmental damage from logging steep slopes. | 3.19 | 3.22 |
| 2.87 | h) technology transfer of expertise to assess management plans in terms of environmental impacts. | 2.89 | 2.85 |
| 2.85 | i) research on the impact of pollutants from forestry practices on the environment. | 2.85 | 2.85 |

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**Ranking of potential CFS initiatives ..... (cont'd.)**

| Combined Mean Score | Forest Sector Issue and Potential CFS Initiatives | Mean Urgency Score | Mean Importance Score |
|---|---|---|---|
| | **2. Loss of forests from fire, insects and disease.** | | |
| 4.54 | a) research and trials on non-chemical control of forest insects. | 4.52 | 4.56 |
| 4.37 | b) research to predict forest insect outbreaks and the effect of various control measures. | 4.41 | 4.33 |
| 4.11 | c) research and technology transfer on the control and prevention of forest insects and diseases. | 4.07 | 4.15 |
| 3.91 | d) continuing to provide expertise and personnel for the Forest Insect and Disease Survey (FIDS) | 3.85 | 3.96 |
| 3.60 | e) funding protection research under development agreements. | 3.62 | 3.58 |
| 3.35 | f) research on the ecological changes associated with forest losses from fire, insects and diseases. | 3.22 | 3.48 |
| 2.65 | g) research on forest fire control. | 2.67 | 2.63 |
| 2.59 | h) research on the economics of fire control versus potential losses. | 2.59 | 2.58 |
| | **3. Forest land alienation due to poor comprehensive land-use planning and a reliance on single-use rather than multiple-use management.** | | |
| 3.13 | a) development of economic models to assist in long-term land-use planning for multiple outputs. | 3.00 | 3.26 |

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**Ranking of potential CFS initiatives ..... (cont'd.)**

| Combined Mean Score | Forest Sector Issue and Potential CFS Initiatives | Mean Urgency Score | Mean Importance Score |
|---|---|---|---|
| 3.08 | b) research and technology transfer to integrate non-forestry concerns into forestry management plans. | 3.04 | 3.11 |
| 2.93 | c) research on the economic value of non-timber forest uses such as recreation. | 2.85 | 3.00 |
| 2.84 | d) research on the economics of comparative land uses. | 2.78 | 2.89 |
| | **4. Uncertain situation of future wood supply versus demand, including pulpwood, sawlogs, and fuelwood.** | | |
| 4.15 | a) research and technology transfer to develop a provincial timber supply model which will highlight the timing and severity of future wood shortages, and account for various human and natural forest depletions and accruals (fire, insects, harvesting, silviculture, browsing, etc.) | 4.19 | 4.11 |
| 3.93 | b) research on methods to increase forest growth. | 3.78 | 4.07 |
| 3.87 | c) continued funding from development agreements for silviculture. | 3.85 | 3.87 |
| 3.52 | d) funding from development agreements for research, related to increasing future wood supplies. | 3.58 | 3.46 |
| 3.41 | e) research on the impact of intensive management on economic wood supply. | 3.39 | 3.42 |



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**Ranking of potential CFS initiatives ..... (cont'd.)**

| Combined Mean Score | Forest Sector Issue and Potential CFS Initiatives | Mean Urgency Score | Mean Importance Score |
|---|---|---|---|
| 2.98 | f) research on the economics of improved fibre utilization. | 3.07 | 2.89 |
| 2.85 | g) research on afforestation on the Avalon and east coast to increase fuelwood supplies. | 2.92 | 2.77 |
| 2.46 | h) funding for improved training for loggers to increase fibre utilization during harvesting. | 2.70 | 2.22 |
| | **5. Inadequate understanding of intensive forest management practices, for example site preparation, planting, seeding, thinning, prescribed burning, etc.** | | |
| 3.64 | a) research on Kalmia control. | 3.60 | 3.68 |
| 3.49 | b) development of a site manual. | 3.39 | 3.59 |
| 3.48 | c) research on site competition following disturbance. | 3.44 | 3.52 |
| 3.47 | d) research to assess the impact of various management strategies on nutrient cycling and site productivity. | 3.31 | 3.62 |
| 3.21 | e) research and technology transfer to increase the efficiency and effectiveness of various intensive forest management practices. | 3.23 | 3.19 |
| 3.04 | f) provide funding to Memorial University for biological research. | 3.00 | 3.08 |

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**Ranking of potential CFS initiatives ..... (cont'd.)**

| Combined Mean Score | Forest Sector Issue and Potential CFS Initiatives | Mean Urgency Score | Mean Importance Score |
|---|---|---|---|
| 2.82 | g) research to improve nursery seedling production and develop nursery stock standards. | 2.67 | 2.96 |
| 2.82 | h) technology transfer of mycorrhizal research | 2.64 | 3.00 |
| | **6. Need to improve and further develop forest legislation and policy relating to a number of issues such as land tenure, private woodlots, control over domestic cutting, and government funding in forestry.** | | |
| 3.91 | a) support federal policies to continue funding forestry activities through development agreements, including research. | 3.69 | 4.12 |
| 3.17 | b) research on the economic value of timber for different uses, e.g. pulpwood vs sawlogs vs fuelwood. | 2.96 | 3.37 |
| 3.08 | c) research on the economic implications of various forest policies. | 3.04 | 3.12 |
| 2.94 | d) support third party evaluations of development agreements to generate objective information for forestry planning in Newfoundland. | 2.91 | 2.96 |
| 2.93 | e) research and technology transfer to develop economic models for allocating silviculture funds among the Forest Management Units based on various criteria. | 2.77 | 3.08 |

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**Ranking of potential CFS initiatives ..... (cont'd.)**

| Combined Mean Score | Forest Sector Issue and Potential CFS Initiatives | Mean Urgency Score | Mean Importance Score |
|---|---|---|---|
| 2.56 | f) research and advisory services to help develop policies and programs for improving the control of cutting on untenured Crown forests, i.e. coastal forests. | 2.50 | 2.62 |
| 2.54 | g) research and technology transfer to help develop policies and programs for private woodlots and community forests. | 2.46 | 2.62 |
| 2.52 | h) research and advisory services on forest tenure and the allocation of timber supplies. | 2.54 | 2.50 |
| | **7. Inadequate adoption of new technology in forestry harvesting and processing in Newfoundland.** | | |
| 2.95 | a) technology transfer of information to improve the efficiency of sawmills in the Province. | 2.96 | 3.93 |
| 2.74 | b) technology transfer of information to improve the efficiency of harvesting methods. | 2.73 | 2.74 |
| | **8. Effect of climate and acid rain on our forests.** | | |
| 2.95 | a) research on acid rain and its impact of forests. | 2.85 | 3.04 |
| 2.82 | b) research on the effect of long-term climatic change on forest growth in Newfoundland. | 2.59 | 3.04 |
| | **9. Inadequate species diversity in our commercial forests and insufficient use of genetically improved stock.** | | |
| 3.41 | a) research and technology transfer to better match tree species to various site conditions. | 3.33 | 3.48 |



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**Ranking of potential CFS initiatives ..... (cont'd.)**

| Combined Mean Score | Forest Sector Issue and Potential CFS Initiatives | Mean Urgency Score | Mean Importance Score |
|---|---|---|---|
| 3.17 | b) research on the biological and economic potential for expanding industrial consumption of forest biomass and satisfying domestic fuelwood needs. | 3.11 | 3.22 |
| 3.11 | c) research and technology transfer to develop seed orchards for tree improvement and breeding research. | 3.07 | 3.15 |
| 3.01 | d) research to develop insect and disease resistant trees. | 2.82 | 3.19 |
| 2.98 | e) transfer of research results on biotechnology and genetic engineering to Newfoundland. | 2.85 | 3.11 |
| 2.91 | f) research to expand species diversity in commercial forests by using "exotic" non-native species. | 2.82 | 3.00 |
| | **10. Inadequate information on our forest land base and forest resource inventory.** | | |
| 3.82 | a) research on forest response following planting and thinning. | 3.70 | 3.93 |
| 3.71 | b) research and technology transfer to develop improved volume tables, and a growth and yield model for estimating yields from natural and managed forest stands. | 3.63 | 3.78 |
| 3.28 | c) develop methods to identify unique forests which should be preserved for ecological reasons. | 3.07 | 3.48 |



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**Ranking of potential CFS initiatives ..... (cont'd.)**

| Combined Mean Score | Forest Sector Issue and Potential CFS Initiatives | Mean Urgency Score | Mean Importance Score |
|---|---|---|---|
| 3.19 | d) technology transfer and funding from development agreements to further improve and expand the computerized forest inventory data base, including the use of Geographic Information Systems (GIS). | 3.19 | 3.19 |
| 3.06 | e) development of regeneration stocking standards and survey methods. | 3.00 | 3.11 |
| 2.89 | f) research on forest stand structure. | 2.70 | 3.07 |
| 2.85 | g) technology transfer of satellite imagery to ecological land classification. | 2.74 | 2.96 |
| 2.73 | h) research and technology transfer on digital terrain mapping. | 2.67 | 2.78 |
| 2.69 | i) research to quantify the area of not sufficiently restocked (NSR) land, and the area of land available to practice commercial forestry. | 2.63 | 2.74 |
| 2.50 | j) research on site classification to assist in the utilization of peatlands. | 2.27 | 2.73 |



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**Ranking of potential CFS initiatives ..... (concl'd.)**

| Combined Mean Score | Forest Sector Issue and Potential CFS Initiatives | Mean Urgency Score | Mean Importance Score |
|---|---|---|---|
| | **11. Poor diversity in forest products and markets in Newfoundland.** | | |
| 3.21 | a) research and technology transfer to promote integrated harvesting of pulpwood, sawlogs and fuelwood. | 3.15 | 3.26 |
| 3.19 | b) research and technology transfer to develop markets for insect and fire-killed timber, hardwoods, specialty softwood species such as larch, forest residues, and trees removed during pre-commercial thinning. | 3.22 | 3.15 |
| 2.83 | c) funding through development agreements to promote the use of local lumber. | 2.81 | 2.85 |
| 2.47 | d) research to determine the potential for Christmas tree production in Newfoundland. | 2.39 | 2.54 |
| | **12. Inadequate communication and education within the forestry sector, and between the forestry sector and the general public.** | | |
| 3.49 | a) research and transfer of information to improve public knowledge of forest management and the importance of forestry in this Province. | 3.41 | 3.56 |
| 3.48 | b) support increased liaison between CFS and industry and Department of Forestry. | 3.27 | 3.69 |
| 3.23 | c) research to gather information on public awareness of forestry, and public concerns with forestry. | 3.04 | 3.41 |
| 3.00 | d) provide funding through development agreements to improve the level of training among forestry workers, e.g. in logging, silviculture, etc., through field trials, workshops and seminars. | 3.00 | 3.00 |



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**Ranking of potential CFS initiatives ..... (concl'd.)**

| Combined Mean Score | Forest Sector Issue and Potential CFS Initiatives | Mean Urgency Score | Mean Importance Score |
|---|---|---|---|
| | **13. Lack of development of the Labrador forest.** | | |
| 3.02 | a) research to explore potential for integrating the Labrador resource and the Island's forest industry. | 3.04 | 3.00 |
| 2.77 | b) research and technology transfer to complement ongoing forest management in Labrador. | 2.73 | 2.81 |
| 2.60 | c) funding under development agreements for promotion of the resource and building necessary infrastructure. | 2.56 | 2.63 |

## APPENDIX 9

**VALUES OF RHO FOR THE INITIATIVES UNDER EACH FOREST SECTOR ISSUE, RANKED BY CRITERION OF URGENCY AND IMPORTANCE.**

| Forest Sector Issue by Survey Ranking | No. of Initiatives | Value of Rho for Initiatives under each Issue |
|---|---|---|
| 1 | 9 | 0.90 |
| 3 | 8 | 1.00 |
| 8 | 4 | 0.80 |
| 2 | 8 | 0.91 |
| 4 | 8 | 0.91 |
| 10 | 8 | 0.88 |
| 12 | 2 | 1.00 |
| 7 | 2 | 1.00 |
| 9 | 6 | 0.80 |
| 6 | 10 | 0.96 |
| 11 | 4 | 0.80 |
| 13 | 4 | 0.80 |
| 5 | 3 | 1.00 |

## APPENDIX 10

## WORKSHOP ATTENDEES

| | |
|---|---|
| Mr. G. Ross | Newfoundland Department of Forestry |
| Mr. E. Blackmore | Newfoundland Department of Forestry |
| Mr. A. Masters | Newfoundland Department of Forestry |
| Mr. N. Stocker | Newfoundland Department of Forestry |
| Dr. J. Munro[1] | Canadian Forestry Service |
| Dr. J. Hudak | Canadian Forestry Service |
| Mr. R. van Nostrand | Canadian Forestry Service |
| Mr. D. Rex | Canadian Forestry Service |
| Mr. M. Butler | Canadian Forestry Service |
| Mr. R. Angel | Canadian Forestry Service |
| Dr. I. Thompson | Canadian Forestry Service |
| Dr. W. Meades | Canadian Forestry Service |
| Dr. B. Titus | Canadian Forestry Service |
| Dr. M. Lavigne | Canadian Forestry Service |
| Dr. A. Raske | Canadian Forestry Service |
| Dr. W. Bowers | Canadian Forestry Service |
| Dr. G. Milne[1,2] | Canadian Forestry Service |
| Mr. B. Furey | Abitibi-Price Inc. |
| Mr. G. van Dusen | Corner Brook Pulp and Paper Ltd. |
| Mr. R. Dingwall | Newfoundland Lumber Producers Association |
| Mr. R. McCubbin | Department of Fisheries and Oceans |
| Mr. D. Taylor | Provincial Department of Environment and Lands |
| Ms. J. Harding | Newfoundland Wilderness Society |
| Dr. G. Bennett | Memorial University of Newfoundland |
| Dr. D. Bajzak | Memorial University of Newfoundland |
| Dr. W. Carroll | Former Director General, Newfoundland Forestry Centre |
| Mr. H. Deichman | Parks Canada |
| Dr. R. Sexty | Workshop Facilitator, Faculty of Business Administration, MUN |

1. Acted as recorders at workshop.

2. Did not participate in questionnaire survey.

## APPENDIX 11

### WORKSHOP AGENDA

Gander, Nfld., June 21-22, 1988

Tuesday, June 21

0900 - 0930 Introductions

CFS - Munro - Outline of rationale
Milne - Outline of survey
Sexty - Outline of process
Participants

0930 - 1045 Ranking of Issues

Explanation of process
Assignment of groups (5 person)
Instructions: Ranking of 6 issues on form provided
Selection of spokesperson
Explanation for ranking
Development of criteria for ranking

1045 - 1115 Refreshments

1115 - 1230 Presentation of Ranking

Reporting - 5 minutes for each group
Recording of ranking on overhead
Presentation of survey ranking (Milne) Copies to be distributed
Comparison of group results
Discussion of differences

1230 - 1330 Lunch

1330 - 1515 Elaboration of Issues

Instructions to groups
Assignment of one issue to each group
To discuss initiatives for assigned issue and explain each
To discuss from an "ideal" perspective, that is, no constraints
Purpose - to provide additional data to understand issue
Groups write ideas on flip chart paper (bold as guide for presentation; small for detail)
Each group reports with one spokesperson

1515 - 1545 Refreshments

1545 - 1630 Presentation of Explanations

Each group reports in 5 minutes
Opportunity provided for contributions by any participant on any issue
Purpose: sharing/distribution of data

1630 - 1700 "CFS Statement of Reality"

Indicates resources available, constrains
Presenter: Munro
Purpose: to establish need for priorities within issue
Summary of session to this point

Wednesday, June 22

0900 - 1015 Ranking of The Initiatives

For each issue, ranking of initiatives
Group format (same as above)
Each group provided with sheets from earlier session

1015 - 1045 Refreshments

1045 - 1130 Reporting back to Plenary Session

One person as spokesperson
Ranking on Form
Criteria on flip sheet
Opportunity for contribution form any participant
Results of survey presented as each group reports
Purpose: obtain sense of importance within each issue

1130 - 1145 Evaluation Session

1145 - 1215 Summary Session

Content summary by Munro/Milne
Process summary by Sexty (including future feedback desired)